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(NASA-News-Release-79-90) HiMAT RESEARCH PLANE TO MAKE FIRST FLIGHT (National Aeronautics and Space Administration) 6 p

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HIMAT RESEARCH PLANE TO MAKE FIRST FLIGHT

The first flight of a new NASA-U.S. Air Force research vehicle that will investigate advanced technology that could lead to future military aircraft with twice the maneuverability of present day fighters is scheduled for July 10 at NASA's Dryden Flight Research Center, Edwards, Calif.

Called HiMAT, for highly maneuverable aircraft technology, the small, radio-controlled research craft is expected to be able to sustain twice the turn rate of current fighters at transonic and supersonic speeds.

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Because the concept includes so many high-risk technical advances, it was decided not to man-rate the research plane, but to fly it using the remotely piloted research vehicle technique developed by NASA several years ago. This technique, which permits piloting the vehicle from the ground, is a more economical and safer method of flight testing high-risk technology.

Incorporated in the plane are several new advances. Flight testing these advances in one vehicle at the same time permits the study of their combined interaction and making the interactions as favorable as possible.

The research vehicle was designed from the start to be built with approximately 30 per cent composite material. In addition to the weight savings, the composite material allows for "aeroelastically tailoring" the wings and canards (the smaller forward set of wings) for increased maneuverability and performance. Both sets of airfoils are aeroelastically tailored to twist and bend in flight to the most favorable shape to achieve maximum performance for the particular flight conditions. The vehicle uses the increased lift from the combination of the canards and wings to increase maneuverability at both subsonic and supersonic speeds.'

The plane uses a digital fly-by-wire (electric) control system instead of a conventional control system. Pilot commands are fed via telemetry to an onboard computer which then sends electrical commands to the flight control surfaces. Fly-by-wire flight control systems are lighter in weight and more versatile in terms of automatic features than conventional systems.

The plane also incorporates an integrated propulsion system that uses a digital computer to provide control of the aircraft's entire propulsion system, instead of a conventional hydromechanical system. The system integrates control of the jet engine and nozzle and permits optimum performance without adverse interaction.

The research vehicle also incorporates active control technology whereby the flight control system provides basic aircraft stability. Use of this technology saves weight and increases performance since the size of the normal stabilizing surfaces can be reduced.

Winglets, small vertical extensions of the wing tips, provide additional stability and performance.

In addition to studying the various new technologies and their interaction, flight test data will be fed into the Differential Maneuvering Simulator at NASA's Langley Research Center, Hampton, Va., for an assessment of a full-scale fighter's capabilities based upon flight verified aerodynamic characteristics. Use of these results in the simulator would permit a military assessment of this particular aircraft's capabilities against specific adversaries.

The research plane, with a wing span of just over 4 1/2 meters (15 feet) and a length of 7 m (22 1/2 ft.), is a 44 per cent scale model of a 7,711-kilogram (17,000-pound) fighter. It weighs 1,542 kg (3,400 lb.) at launch. Powered by a General Electric J-85 jet engine, HiMAT should be capable of speeds in excess of Mach 1.5 (one and one-half times the speed of sound) or about 1,600 kilometers per hour (1,000 miles per hour).

The plane will be air launched, with its jet engine running, from a B-52 flying at 14,000 m (45,000 ft.). The pilot in the ground cockpit will then take full control and fly the entire mission including landing on the dry lake bed at NASA Dryden. If required, back-up flight control is available through a two-seat F-104 chase aircraft.

Two vehicles were built by the North American Aircraft Division of Rockwell International for approximately $17 million. The concept is a joint NASA-U.S. Air Force program sponsored by NASA's Office of Aeronautics and Space Technology. The Dryden center has overall program responsibility with assistance provided by the Air Force's Flight Dynamics Laboratory, Wright-Patterson Air Force Base in Ohio.

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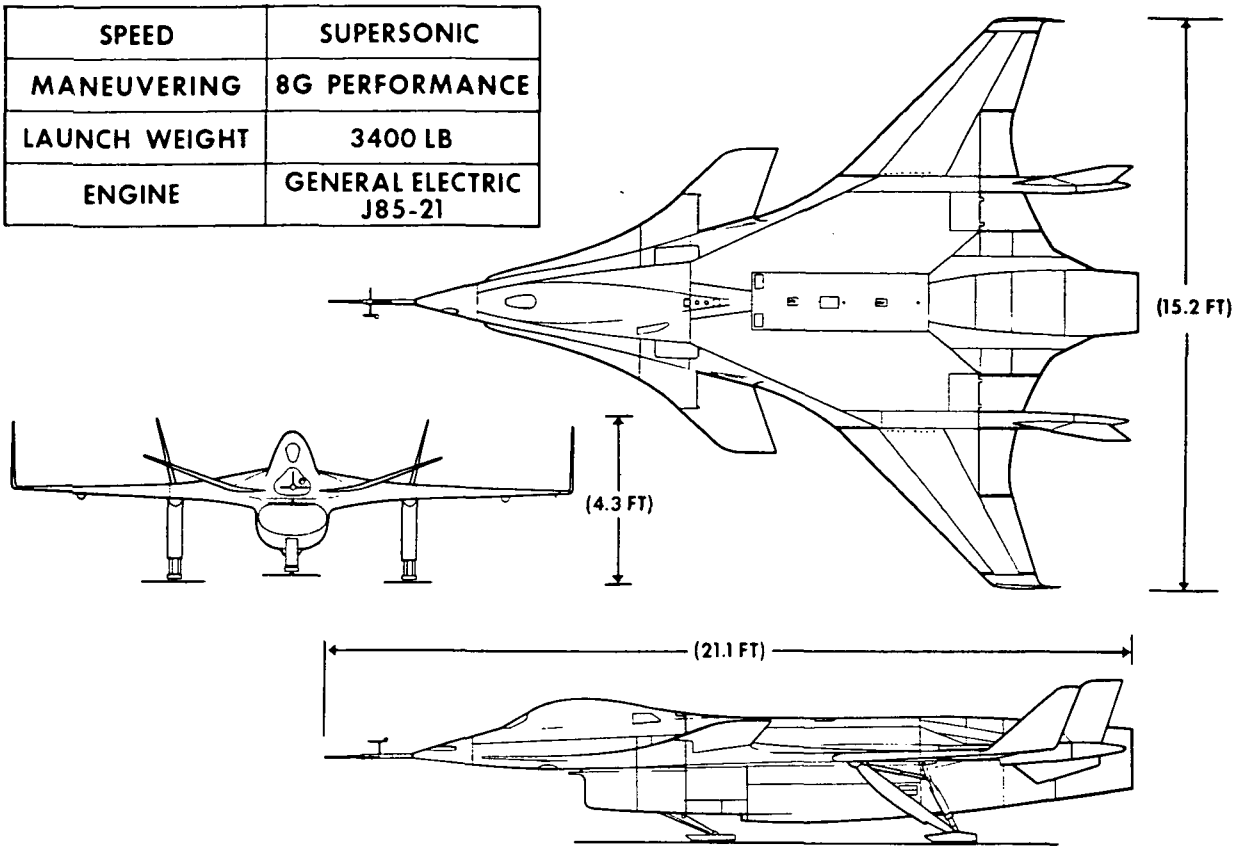
HiMAT

SPEED	SUPERSONIC
MANEUVERING	8G PERFORMANCE
LAUNCH WEIGHT	3400 LB
ENGINE	GENERAL ELECTRIC J85-21



TURN CAPABILITY

- SUSTAINED LOAD FACTOR
- 30,000 FT ALTITUDE
- M = 0.9

DL/DSF CAPABILITY

- DL 1G
- DSF .3G

SUPERSONIC CAPABILITY

- M = 1.2 ~ 6G, 30K FT ALTITUDE
- M = 1.4 ~ 4G, 30K FT ALTITUDE